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APRIL 1985 NUMBER 200

MONTHLY REPORT

ON THE NUCLEAR FUEL MARKET

NUEXCO

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MONTHLY REPORT ON THE NUCLEAR FUEL MARKET

April 1985 No. 200

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To Our Readers

Nuexco has just mailed a 1984 Annual Review to our full-service subscribers. This 54-page special report covers nuclear fuel market developments throughout the world in 1984 and early 1985. In particular, it analyzes the condition and pricing trends of the spot/near-term markets for uranium and secondary market enrichment services. Nuexco market values for 1984 have also been brought together in a series of tables for reference.

If you would like to purchase copies of the 1984 Annual Review Special Report, they are available for $175 each. Please contact our Headquarters:

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NATURAL URANIUM AND SECONDARY MARKET CONVERSION

The **Exchange Value** as of March 31, 1985 is **$15.00** per pound U_3O_8, unchanged since last month. **Active supply** of natural uranium (U_3O_8 and UF_6) for spot or near-term delivery totals **4,250,000** pounds equivalent U_3O_8 as concentrates or UF_6, down 20 percent since last month. The corresponding figure for **active demand** is **4,055,000** pounds, up 80 percent. The spot and near-term **supply-demand ratio** fell to **1.0:1.**

The *Current Market Data* section of this Report lists eleven natural uranium sales transactions, involving a total of approximately 2,100,000 pounds equivalent U_3O_8. Three of the transactions reported this month involved natural UF_6, all involved deliveries before 1986, and ten met the criteria for inclusion in the current Transaction Value calculation.

The **Transaction Value** as of March 31, 1985 is **$15.05** per pound U_3O_8, down $0.65 since last month. The current Transaction Value includes 16 transactions involving a total of 2.4 million pounds U_3O_8 or equivalent UF_6 and covers a period of 3 months. The Transaction Value fell as a result of the large number of transactions added to the calculation this month, allowing the removal from the calculation of two months' transactions involving over one million pounds of uranium. Those transactions, most of which took place at the end of 1984, involved prices consistent with the slightly higher Exchange Values ($15.50 and $15.25) of those months.

The **Loan Use Charge Rate** as of March 31, 1985 is unchanged at **5 percent** per annum, as a lender continued to offer a substantial quantity of material at that rate.

* * *

The uranium market was unusually active in March. Transactions continued to take place slightly above and below the $15.00 level, and there were few indications of major price firming. Small quantities of material tended to command lower prices, but there was enough activity on both sides of the market to keep the Exchange Value temporarily stable. The heightened level of buyer interest has halted the slow decline of prices that was underway at the end of 1984.

* * *

The **Conversion Value** is **$1.00** per pound U in UF_6, unchanged since last month. One secondary market conversion transaction is reported, involving approximately 100,000 to 300,000 pounds U in UF_6. Active supply of secondary market conversion services for delivery within three years totals 110,000 pounds U as UF_6. Active secondary market demand for conversion amounts to 255,000 pounds U in UF_6.

It is becoming more and more difficult to characterize the secondary conversion market with only one price. Two distinctly different combinations of buyer-seller motivations are making two apparently conflicting types of pricing strategies necessary for the completion of transactions.

1. Sellers of natural UF_6 find it necessary to offer discounts of 25 to 35 percent (off the Nuexco Conversion Value) on the conversion component of their material in order to stimulate buyer interest.

2. Conversely, buyers that want secondary market conversion services (as opposed to UF_6) need to pay as much as a 50-percent premium (on the Nuexco Conversion Value) to attract a willing seller. Only one seller of conversion services is actively in the market at present, yet there are several buyers.

Thus, the conversion component contained in UF_6 is anywhere from one-half to three-fourths the value of conversion services purchased on the secondary market. That such apparently contradictory situations are present in the market is testimony to the degree of imperfection in the nuclear fuel market, imperfection which is most severe in conversion, the interface between U_3O_8 and UF_6. In theory, the value of UF_6 should be equal to the sum of its U_3O_8 and conversion components. However, under the present market conditions, that equality does not hold. In fact, UF_6 is worth *less than* the sum of its constituents. Hence the need for UF_6 sellers to discount conversion, while conversion buyers need to pay a premium.

ENRICHED URANIUM AND SWUS

The Nuexco **SWU Values** as of March 31, 1985 are:

1. For **DOE origin,** a tails assay of 0.30 weight-percent U_{235}, and certifiable as excess:
   a. For FY85 delivery, $98 per SWU, down 4;
   b. For FY86 delivery, $25 discount from the USEC base price on delivery (20 last month);
2. For **other** SWUs (includes DOE origin SWUs not certifiable as excess and non-DOE origin SWUs):
   a. For delivery in calendar year 1985, $80 per SWU, unchanged;
   b. For delivery in calendar year 1986, $85 per SWU, down 3.

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One secondary market SWU transaction is reported, involving approximately 300 to 600 thousand SWUs of Eurodif origin.

* * *

The continuing drop in the value for SWUs certifiable as excess for delivery in fiscal year 1985 reflects the almost complete lack of active demand for FY85 material. One active buyer remains, and the rest of the SWU demand has shifted to the FY86 market as it continues to develop. DOE's announcement of FY86 SWU prices is expected in the coming weeks. In the meantime, the DOE market remains glutted with sellers, applying downward pressure on prices. There is still little activity in Europe in the market for other SWUs (non-DOE or DOE SWUs not certifiable as excess). Buyers can expect prices to fall in response to DOE's offer of incentive prices for SWUs purchased for delivery in 1987 and beyond.

At the beginning of April, DOE sent letters to USEC customers proposing an incentive pricing program for enrichment. Responses in the form of bids are due April 30, 1985. Acceptance of the bids is contingent upon a large-enough response to make the program viable: perhaps as much as 2,000,000 SWUs. As reported in last month's pricing section (Report 199, March 1985), FY87 and FY88 SWUs will be priced at $90 per SWU (fixed), and FY89 and FY90 SWUs will be priced at $90 per SWU (escalated from October 1, 1988 according to the escalation formula specified in Article 4 of the USEC). Utilities will be able to purchase incentive-priced SWU for FY87-88 or for FY87-90. Other details are as follows:

1. The customer must commit to buy 100 percent of uncommitted requirements under the incentive pricing arrangement.

2. The customer may purchase more than 30 percent of requirements if that opportunity was created by a contract termination that occurred before December 31, 1983.

3. Less than 30 percent of requirements may be purchased if the opportunity to do so is a result of a contract agreed to before February 15, 1985.

4. The Variable Tails Assay Option (VTAO) may be selected between 0.2 and 0.3 percent by the utility *at no charge*. Presumably, the customer will be required to give notice according to the period established in the USEC. The customer may select only one tails assay per SWU order.

Because the utilities are required to bid to DOE, Nuexco expects that some customers will bid back different terms to DOE in order to obtain the best deal possible. It is not known whether DOE will extend the response period past the April 30 deadline.

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CURRENT MARKET DATA

March 31, 1985	Market Values	Active Supply[1] (thousands)	Active Demand[1] (thousands)
EXCHANGE VALUE	**$15.00**/lb. U_3O_8	4,250	4,055
CONVERSION VALUE	**$1.00**/lb. U in UF_6	110	255
SWU VALUES			
DOE origin, certifiable as excess, 0.3 tails assay			
FY85 delivery	**$98**/SWU		
FY86 delivery	**$25** discount/SWU		
Other SWUs (non-DOE or non-certifiable)			
calendar year 1985 delivery	**$80**/SWU		
calendar year 1986 delivery	**$85**/SWU		
LOAN USE CHARGE RATE	5%/annum	0	0

TRANSACTION VALUE	$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
	15.05	2.4	16	3

[1]Supply and demand tables in the *Current Market Data* section of this Report detail the numbers for each category.

DEFINITIONS

1. The **Exchange Value** is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the date indicated.
2. The **Conversion Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the date indicated.
3. The **SWU Values** represent Nuexco's judgment of the price at which transactions for the sale of significant quantities of SWUs of stated origin for delivery in the specified time period could be concluded as of the date indicated.
4. The **Loan Use Charge Rate** is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the date indicated.
5. The **Transaction Value** is a weighted average price of recent natural uranium sales transactions. The calculation is based on prices paid in:
   a. Transactions closed within the previous three-month period for which delivery is scheduled within one year of the transaction date;
   b. At least ten transactions;
   c. Transactions involving a sum total of at least 2 million pounds U_3O_8 equivalent.

   The sample time is extended as necessary to include these minima. Other currencies are converted to US dollars using conversion rates in effect on or near the transaction date.

DERIVATIONS AND COMMENTS

1. All Market Values are based on:
   a. Data from recently completed transactions.
   b. Data from pending transactions.
   c. Firm bids to buy or borrow, and firm offers to sell or lend.
   d. Prices purchasers or rates borrowers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy or borrow, and prices sellers or rates lenders have expressed a willingness to offer, but for which Nuexco is not aware of firm offers to sell or lend.
2. Prices associated with deliveries under old or renegotiated contracts or other than arm's-length transactions are not considered in the determination of these Market Values.
3. In the determination of the Conversion Value, Nuexco does not consider transportation charges other than those customarily provided by primary suppliers of conversion services.
4. The prices of conversion services or SWUs delivered under long-term contracts with primary suppliers are not considered in the determination of either the Conversion Value or SWU Value.
5. For the DOE SWU Values, Nuexco converts SWU prices at varying tails and product assays to equivalent SWU prices at a tails assay of 0.30 weight-percent U_{235} and a product assay of 3.0 weight-percent U_{235}, assuming feed costs corresponding to the Nuexco Exchange and Conversion Values determined as of the same date.
6. In calculating the Transaction Value, Nuexco does not account for the price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of future Exchange Values or any other indeterminant variable. Also excluded from the calculation are any other transactions in which the delivery price is defined in such a way that it cannot currently be determined.

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CURRENT MARKET DATA

EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates			per kg. U in Concentrates		
	This Month (Mar. 31, 1985)	Last Month (Feb. 28, 1985)	12 Months Ago (Mar. 31, 1984)	This Month (Mar. 31, 1985)	Last Month (Feb. 28, 1985)	12 Months Ago (Mar. 31, 1984)
Australia (dollar)	21.28	20.76	18.12	55.31	53.97	47.11
Belgium (comm. franc)	940.44	1,001	905	2,445	2,602	2,353
Canada (dollar)	20.53	20.73	21.73	53.38	53.89	56.50
Finland (markka)	97.66	103.38	94.34	253.88	268.76	245.26
France (franc)	143.13	152.39	135.24	372.11	396.19	351.60
FRG (mark)	46.90	49.85	43.92	121.94	129.60	114.17
Italy (lira)	29,922	30,902	27,490	77,791	80,339	71,469
Japan (yen)	3,793	3,881	3,805	9,860	10,090	9,892
Netherlands (guilder)	52.80	56.24	49.53	137.26	146.22	128.78
South Africa (rand)	28.71	30.00	21.01	74.63	77.99	54.63
Spain (peseta)	2,610	2,745	2,518	6,786	7,137	6,547
Sweden (krona)	135.01	140.71	130.87	351.00	365.82	340.23
Switzerland (franc)	38.88	42.37	36.37	101.08	110.16	94.56
UK (pound)	12.20	13.76	11.71	31.72	35.78	30.43
US (dollar)	15.00	15.00	17.00	39.00	39.00	44.20

TRANSACTION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates			per kg. U in Concentrates		
	This Month (Mar. 31, 1985)	Last Month (Feb. 28, 1985)	12 Months Ago (Mar. 31, 1984)	This Month (Mar. 31, 1985)	Last Month (Feb. 28, 1985)	12 Months Ago (Mar. 31, 1984)
Australia (dollar)	21.35	21.73	20.52	55.50	56.49	53.34
Belgium (comm. franc)	943.57	1,047	1,025	2,453	2,723	2,665
Canada (dollar)	20.60	21.70	24.61	53.56	56.41	63.97
Finland (markka)	97.98	108.20	106.83	254.73	281.30	277.72
France (franc)	143.61	159.50	153.14	373.35	414.68	398.14
FRG (mark)	47.06	52.18	49.73	122.35	135.65	129.28
Italy (lira)	30,022	32,344	31,129	78,050	84,088	80,928
Japan (yen)	3,805	4,062	4,308	9,893	10,561	11,201
Netherlands (guilder)	52.97	58.87	56.09	137.72	153.04	145.82
South Africa (rand)	28.80	31.40	23.79	74.88	81.63	61.86
Spain (peseta)	2,619	2,873	2,851	6,808	7,470	7,413
Sweden (krona)	135.46	147.28	148.19	352.17	382.89	385.26
Switzerland (franc)	39.01	44.35	41.19	101.42	115.30	107.07
UK (pound)	12.24	14.40	13.26	31.82	37.45	34.46
US (dollar)	15.05	15.70	19.25	39.13	40.82	50.05

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on March 29, 1985.

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CURRENT MARKET DATA

CONVERSION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U as UF_6			per kg. U as UF_6		
	This Month (Mar. 31, 1985)	Last Month (Feb. 28, 1985)	12 Months Ago (Mar. 31, 1984)	This Month (Mar. 31, 1985)	Last Month (Feb. 28, 1985)	12 Months Ago (Mar. 31, 1984)
Australia (dollar)	1.42	1.38	0.85	3.13	3.05	1.88
Belgium (comm. franc)	62.70	66.71	42.60	138.22	147.07	93.91
Canada (dollar)	1.37	1.38	1.02	3.02	3.05	2.25
Finland (markka)	6.51	6.89	4.44	14.35	15.19	9.79
France (franc)	9.54	10.16	6.36	21.04	22.40	14.03
FRG (mark)	3.13	3.32	2.07	6.89	7.33	4.56
Italy (lira)	1,995	2,060	1,294	4,398	4,542	2,852
Japan (yen)	252.84	258.73	179.05	557.43	570.41	394.74
Netherlands (guilder)	3.52	3.75	2.33	7.76	8.27	5.14
South Africa (rand)	1.91	2.00	0.99	4.22	4.41	2.18
Spain (peseta)	174.00	183.02	118.50	383.61	403.48	261.25
Sweden (krona)	9.00	9.38	6.16	19.84	20.68	13.58
Switzerland (franc)	2.59	2.82	1.71	5.71	6.23	3.77
UK (pound)	0.81	0.92	0.55	1.79	2.02	1.21
US (dollar)	1.00	1.00	0.80	2.20	2.20	1.76

SWU VALUES EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	DOE SWU FY85 (March 31, 1985)	Non-DOE SWU 1985 delivery (March 31, 1985)	Non-DOE SWU 1986 delivery (March 31, 1985)
Australia (dollar)	139.01	113.48	120.57
Belgium (comm. franc)	6,144	5,016	5,329
Canada (dollar)	134.15	109.51	116.36
Finland (markka)	638.02	520.83	553.39
France (franc)	935.11	763.36	811.07
FRG (mark)	306.44	250.16	265.79
Italy (lira)	195,492	159,585	169,559
Japan (yen)	24,779	20,228	21,492
Netherlands (guilder)	344.95	281.59	299.19
South Africa (rand)	187.56	153.11	162.68
Spain (peseta)	17,052	13,920	14,790
Sweden (krona)	882.09	720.07	765.08
Switzerland (franc)	254.02	207.36	220.32
UK (pound)	79.71	65.07	69.13
US (dollar)	98.00	80.00	85.00

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on March 29, 1985.

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CURRENT MARKET DATA

RECENT TRANSACTIONS[1]

Uranium Sales

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current E.V.	Seller	Buyer	Remarks
3381	1985	less than 50	100	US Producer	US Producer	
3380	1985	less than 50	98	US Producer	US Producer	
3371	1985	601-1,000	R[2]	US Utility	European Utility	UF_6. Inventory sale.
3370	1985	301-600	93	US Utility	European Utility	UF_6. Inventory sale.
3369	1985	101-300	93	US Utility	US Utility	UF_6. Inventory sale.
3367	1985	less than 50	94	US Producer	US. Utility	
3364	1985	101-300	101	US Producer	US Producer	
3358	1985	301-600	98	US R[2]	US R[2]	
3356	1985	less than 50	97	US R[2]	US R[2]	
3346	1985	less than 50	94	Trader	US Utility	
3344	1985	less than 50	95	Trader	US Utility	

[1] Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.
[2] The notation *R* means that Nuexco either does not know, or that Nuexco has restricted that information to protect client confidentiality.

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RECENT TRANSACTIONS[1] *(continued)*

Secondary Market Conversion Services

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U equivalent)	Approximate Price as Percent of Current C.V.	Seller	Buyer	Remarks
3357	1985	101-300	65	R[5]	US Utility	

Enrichment Services
Secondary Market Sales

Nuexco Transaction Number	Delivery Period	Approximate Quantity[2] (thousands of SWUs)	Approximate Price[3] as Percent of Current SWU Value[4]	Seller Group	Buyer Group	SWU Origin	Remarks
3341	1986-1988	301-600	see remarks	European Entity	US Utility	Eurodif	Series of fixed prices.

[1] Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.
[2] If tails assay is unknown or unspecified, Nuexco's calculation of SWU quantity assumes 0.30 w/o tails assay.
[3] Price is not normalized to 0.30% tails assay.
[4] Refers to SWU Value that corresponds to SWUs included in transaction. When prices and SWU values are expressed as discounts (e.g., X dollars less than DOE's USEC base price at time of delivery), the percentage refers to the ratio of the *discounts*, not the ratio of the prices.
[5] The notation *R* means that Nuexco either does not know, or that Nuexco has restricted that information to protect client confidentiality.

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CURRENT MARKET DATA

URANIUM SUPPLY
(March 31, 1985)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale:			
ACTIVE			
1575	500	500 per year	
1860	400	1,500 per year	
2134	220	220 per year	1986-87
2389	200	—	
2392	35	—	UF_6
2538*	15	—	
2565	400	—	
2574*	640	—	
2584*	5	—	
2633	1,800	—	
2675	35	—	UF_6
2263	—	500 per year	1985-90
2625	—	250 per year	1987-89
2657	—	980	1986; UF_6
2680*	—	250 per year	1986-92
TOTAL:	4,250		
INACTIVE			
2191	125	—	UF_6
2275*	170	—	
2335	275	—	
2336	250	250 per year	1985-94
2495	130	—	UF_6
2553	300	—	
2654*	250	250 per year	UF_6
2271	—	500 per year	1985-88
2297	—	200 per year	1986-89
2368	—	250 per year	1987-90
2670	—	525	1987
TOTAL:	1,500		

* New or revised since last month.
[1] Measured from the date of this Report.
[2] For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 0564, 2038, 2288A, 2288B, 2499, 2514, 2603, 2650.

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SWU SUPPLY
(January 31, 1985)

Nuexco Project Number	Delivery Period[1] (Thousands of SWUs) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale:			
ACTIVE			
2160	150	100 per year	
2359*	—	200	
2583	50	—	
2624	100	—	
2631	150	—	
2632	25	—	
2689*	40	—	
2285	—	300	
2513	—	25	1986
2517	—	150	1986-89
2571*	—	55	1987
2657A*	—	175	1986
TOTAL:	515		
INACTIVE			
2164	25	—	
2589	50	—	
2378*	—	120	1988
2510*	—	50	
2531	—	150	1987
TOTAL:	75		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes SWUs deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: None.

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CURRENT MARKET DATA

SWU DEMAND
(January 31, 1985)

Nuexco Project Number	Delivery Period[1] (Thousands of SWUs) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Inquiries to Purchase:			
ACTIVE			
2459	30	—	
2480	30	—	
2655	10	—	
2665*	50	—	
2519	—	30 per year	1987 on
2578	—	100	1986
2640*	—	40	1987
2653	—	100	1986-90
2658	—	5	1986
2689A*	—	40	1986
TOTAL:	120		
INACTIVE			
2543	25	25	1986
2585*	90	90	1986
2500	—	500	1987-90
2512	—	15 per year	1987 on
2595	—	50	1986
TOTAL:	115		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes SWUs deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 2443.

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PRIMARY MARKET CONVERTERS IN THE USA

The current uranium enrichment technology requires a gas as feed material, and commercial milling technologies produce natural uranium in solid form. Therefore, the enrichment process requires the conversion of solid uranium concentrates to a gas, uranium hexafluoride (UF_6). The conversion process is performed by five primary converters in the Western world. Because it represents only about three percent of fuel cycle costs (and less than one percent of electricity costs), the conversion process often is overlooked. UF_6 stockpiles at conversion plants and declining sales have caused converters to operate at substantially less than nameplate capacities. In today's buyers' market, the oversupply has not yet been counteracted by strong demand; in fact, the oversupply continues to grow. Although converters' inventories further complicate the true conversion supply situation, it is clear that there is already in place more conversion capacity than necessary for at least fifteen years. Nuexco forecasts indicate worldwide UF_6 consumption will be approximately 30,000 metric tons of uranium (MTU) in UF_6 in 1985, 40,000 MTU in 1990, and 45,000 MTU in 1995 (Table 1). On the other hand, current Western world conversion capacity already exceeds 50,000 MTU per year (Table 2).

Two companies in the USA provide conversion services for the world market. Allied Chemical, a division of Allied Corporation, converts uranium concentrates to UF_6 at its facility in Metropolis, Illinois. Sequoyah Fuels Corporation, a subsidiary of Kerr-McGee Corporation, converts natural uranium at its plant in Gore, Oklahoma.

Table 1

WORLD CONVERSION REQUIREMENTS FORECAST[1]
(Thousands MTU in UF_6)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
United States	9.9	12.6	12.7	12.4	12.5	12.5	12.9	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6
Europe[2]	13.1	16.6	16.7	17.3	17.6	18.0	18.3	18.4	19.5	20.2	19.4	20.6	20.2	20.9	20.2
Far East[3]	4.3	6.1	6.2	6.4	7.1	7.5	7.3	8.6	8.9	8.6	9.5	9.8	10.3	10.7	10.0
Other Nations[4]	1.7	1.8	2.0	2.1	2.6	2.4	2.5	2.3	3.0	2.6	3.1	2.6	2.8	2.8	2.8
TOTAL[5,6]	29.0	37.1	36.6	38.2	39.7	40.4	41.1	41.9	43.9	43.9	44.5	45.5	45.8	47.0	45.6

[1] Table ignores lead time for conversion. Consumption is based on computed quantities of U_3O_8 used to fabricate fuel for loading and reloading reactors operating, under construction, on order or forecasted as of November 15, 1984. Compiled and computed on a reactor-by-reactor basis; quantities for each reactor are based on specific core characteristics, 0.25% tails assay, no recycling, 24-month lead time for procuring first cores and 12-month lead time for procuring each reload. The estimates reflect annual consumption and not refueling quantities. First core fuel previously procured is not included.
[2] Austria, Belgium, Finland (two Swedish-supplied plants), France, Germany (FRG), Italy, Netherlands, Portugal, Spain, Sweden, Switzerland, United Kingdom, and Yugoslavia.
[3] China (PRC), Japan, Korea, Philippines, Taiwan.
[4] Argentina, Brazil, Canada, Egypt, India, Mexico, Pakistan, South Africa.
[5] Excludes Bulgaria, Cuba, Czechoslovakia, Germany (GDR), Finland (two USSR-supplied plants), Hungary, Poland, Rumania, and the USSR.
[6] Columns may not add, due to rounding.

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BASIC CONSIDERATIONS

The two companies provide conversion for most of the reactors in the USA, and for about forty percent of the reactors worldwide (Table 2).

Table 2

MARKET SHARES OF PRIMARY CONVERTERS[1]

Converter	Plant Location	Capacity (MTU/year)	Market Share (%) USA	World
Allied Chemical	Metropolis, Illinois	12,700	45	20
Sequoyah Fuels	Gore, Oklahoma	9,000	40	21
Other Converters[2]	—	33,000	8	46
Uncovered or Unknown	—	—	7	13

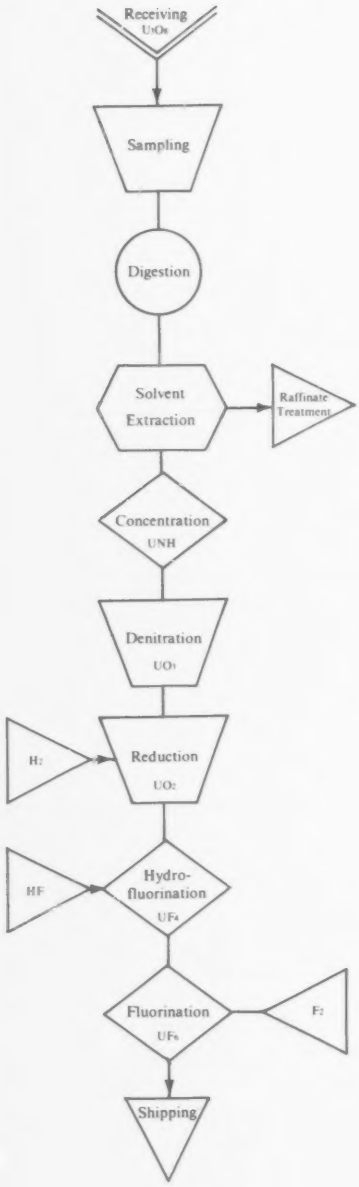
[1]Based on the number of operational reactors (commercial or not) supplied by each converter.
[2]BNFL (British Nuclear Fuels, Ltd.), Comurhex, Eldorado.

Allied began converting uranium concentrates at its plant in Metropolis, Illinois, in 1959. Using the dry fluoride volatility process, Allied currently has an annual capacity of 12,700 MTU, and has shipped over 150 million pounds of UF_6. The dry process is used to convert solid natural uranium concentrates only, the most common form. Sequoyah Fuels began operation in 1970 with an annual conversion capacity of 4,550 MTU. In 1978, Sequoyah expanded the facility, increasing its annual capacity to 9,000 MTU and introduced technology capable of processing slurry forms of uranium concentrates, which are becoming more prevalent due to the increasing use of alternative recovery methods. The conversion of slurry through the wet process eliminates the need for drying and packaging slurry at the milling site.

Sampling

Solid natural uranium concentrates (U_3O_8) are shipped by truck from a mill. Upon receipt, each 55-gallon drum is weighed, and the powder is dumped into an elevated hopper for sampling. Both Allied and Sequoyah Fuels retain an independent weighing and sampling firm, Lucius Pitkin, Inc. The concentrates are sampled for moisture content, uranium content and impurities, as well as overall weight.

Figure 1. Wet Conversion Process



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Pitkin utilizes the falling-stream method of sampling, in which several sample cutters remove ten percent of the material dumped in a falling stream from the feed batch. The process is repeated several times to insure a representative sample. Both the shipper and the receiver (converter) accept Pitkin's results on moisture content and weight. To verify uranium content and impurities, samples are sent to both producer and converter. If the parties agree to within 0.20 percent (Allied requires agreement to within 0.21 percent), the results are deemed acceptable. If they do not agree, the sample can be umpired, in which case the losing party pays for the independent umpiring.

At Sequoyah Fuels, uranium concentrates received in slurry form from solution mining usually arrive via tank trailer with approximately 4,000-gallon capacity. Nitric acid is added to the tank to dissolve the slurry, and the solution is pumped to a weigh tank for measurement and sampling.

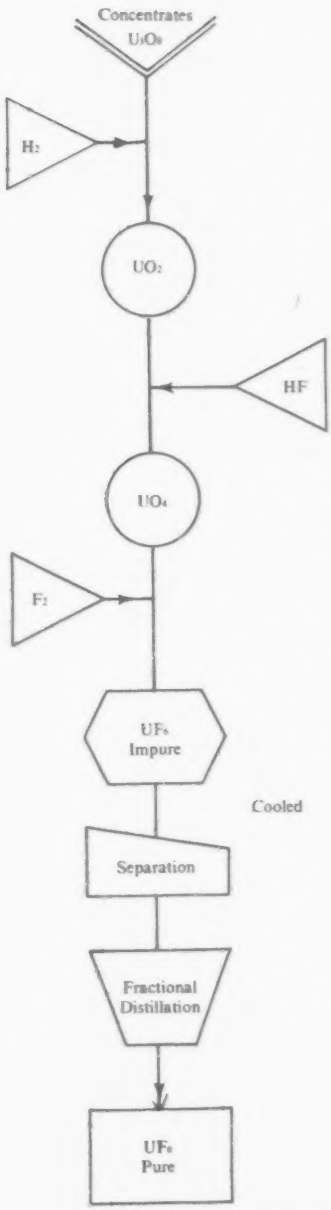
Conversion

In Sequoyah's wet process, conversion begins with the dissolution of uranium concentrates into uranyl nitrate using nitric acid (Figure 1). After the nitric acid digests the concentrates, the solution is similar to the slurry-nitric acid mixture found in the tank trailers (to which it often is added). Various solvent extraction methods follow, in which the uranyl nitrate is scrubbed of impurities. The uranium is separated from the acid solution by mixing with organic solvents and settling, leaving the impurities in the acid solution. This barren acid solution, or raffinate, is removed and the purified uranyl nitrate is re-extracted into water. A concentration step follows, in which evaporation concentrates the weak uranyl nitrate solution into molten uranyl nitrate hexahydrate (UNH), an intermediate which subsequently undergoes denitration (the removal of the nitrate through thermal decomposition) to form uranium trioxide (UO_3).

The next steps involve the reduction and fluorination of the UO_3 powder. Hydrogen is introduced, capturing oxygen to form UO_2 and water (H_2O). The UO_2 powder then reacts with hydrofluoric acid (HF) to become UF_4, known as green salt. Finally, the UF_4 reacts with elemental fluorine to form UF_6. Allied and Sequoyah Fuels manufacture their own fluorine; Sequoyah produces fluorine gas by electrolysis at the conversion site, while Allied operates a commercial hydrofluoric acid (HF) plant in Geismar, Louisiana.

Sequoyah Fuels processes slurry by adding nitric acid to the slurry in the tank trailer for digestion, and pumping

Figure 2. Dry Conversion Process



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the solution into weigh tanks for measurement. Liquid samples are taken, and the solution joins the separation system.

Allied's dry process differs from wet processing in several ways. The first step consists of the direct fluorination of the U_3O_8 concentrates (Figure 2). Hydrofluoric acid reacts with the uranium oxides or ammonium diuranate (ADU), and the impure UF_6 undergoes a series of purification steps. Problems in the dry process can arise when magnesium or sodium uranates are used; the HF reaction forms sticky products which can adhere to the reactor walls at the conversion facility. No significant differences in quality of UF_6 have been found between the two conversion processes, although the wet process contains the flexibility to convert slurries and other non-solid forms of feed material.

Following conversion, the UF_6 gas enters cold traps designed to liquify the gas so it can be drained into shipping cylinders. As the cylinders cool to room temperature, the UF_6 solidifies. Because of the tremendous weight of the solid UF_6, a truck can transport only two ten-ton (6,400 Kg) cylinders at a time. Fourteen-ton (8,400 Kg) cylinders often are used when shipping overseas. The cylinders are then ready for shipment to one of DOE's enrichment plants, or, in some cases, to an overseas enrichment plant.

Conversion Supply and Demand

It is difficult to determine true world supply figures for conversion. Most of the facilities in operation today currently operate well below full nameplate capacity because of the industry's oversupply situation. The flow of uranium concentrates into conversion facilities remains greater than the flow of UF_6 to enrichment plants, resulting in the buildup of large stockpiles at the conversion sites. Moreover, the rate at which the converter processes material is subject to a number of variables, including the efficiency of the electrolytic elemental fluorine plant.

Similarly, conversion demand can be influenced by many variables. A higher enrichment tails assay would result in increased uranium demand, proportionately increasing the need for UF_6. Reprocessing, with respect to both uranium recycling and plutonium, would reduce significantly the demand for natural uranium, but commercial applications are a long-term consideration and should not affect conversion demand in this century. These uncertainties pose only minor problems for converters when planning for expansion or a new facility, the construction of which requires a lead time of approximately five years.

In March 1985, DOE will announce its intentions for the future of uranium enrichment in the USA. One of the new technologies under consideration, Atomic Vapor Laser Isotope Separation (AVLIS), is a method of drawing off the U_{235} isotope by laser excitement. This process uses uranium metal as feed material for enrichment, instead of UF_6. Should DOE decide to proceed with AVLIS as its enrichment technology of the future, the conversion industry in the USA would be forced to adapt accordingly.

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AUSTRALIA

In view of the current state of the uranium market, the announcement by Energy Resources of Australia, Ltd. (ERA) of two long-term supply contracts with US utilities was both surprising and revealing. The agreement with American Electric Power (AEP) is actually a renegotiation of the original AEP-Ranger agreement under which deliveries had been suspended because market prices had fallen well below the Australian floor price. The second agreement is with Pennsylvania Power & Light.

Notwithstanding the press response to the ERA announcement, it is most unlikely that US utilities would agree to terms that could require them to buy large amounts of uranium at prices substantially higher than spot market prices. Accordingly, it is probable that these agreements are, in effect, *call* options that allow considerable delivery flexibility and provide that if, as, and when market prices exceed the Australian floor price, the utilities may call on ERA for delivery at discounts from market price. Alternately, the contracts could be structured as *put* options, giving ERA the right to deliver to the utilities at prices below market whenever certain contract terms are met, such as market price exceeding the Australian floor price for a specified period. In either case, the contracts probably do not require the utilities to take and pay for any meaningful quantities while market price is below the Australian floor.

Perhaps the greatest significance of these contracts is the continuing, subtle maneuvering for position between ERA and the Olympic Dam project (Roxby Downs). As ERA adds customers, Olympic Dam's roster of potential customers is reduced accordingly. If the present floor price is maintained (or raised), neither ERA nor Olympic Dam would be able to export under market price contracts until market prices rise sharply or the floor price is reduced. In either case, ERA's ability to increase capacity rapidly and at lower cost per unit seems to give it a considerable advantage over Olympic Dam, which has to base load, finance, and construct an entirely new facility.

However, the Olympic Dam partners, Western Mining and British Petroleum, have their own unique situation. Preliminary marketing is under way, and with copper and gold as co-products, usual financing requirements may be alleviated. This would allow uranium production to begin at levels that might be sub-economic in a stand-alone uranium operation. Finally, the Olympic Dam project presents the prospect of supply diversity within Australia combined with very large, long-term reserves backed by financially responsible ownership.

* * *

Western Mining Corporation (WMC) and BP Australia, the joint venture partners in the Olympic Dam project (Roxby Downs), have commissioned Fluor Corporation to carry out a technical study. The study will be completed in March 1985 and is part of the A$150 million feasibility study now in progress. Because market demands for the planned copper and uranium production are limited, the project will be designed to reach full production in stages. The first stage will be designed to treat high-grade ore averaging three percent copper, 3.3 pounds U_3O_8 and 0.4 grams of gold per ton of ore. Annual yield would be 2,000 metric tons of U_3O_8 and 55,000 metric tons of copper starting in 1988. Gold production could begin earlier at a rate of 100,000 ounces per year. Part of the study will review the work done to date, but it also signals the further acceleration of the project by WMC and BP toward their goal of beginning production in the late 1980s.

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RECENT DEVELOPMENTS

SOUTH AFRICA

Fourth quarter production from Chamber of Mines producers amounted to approximately 3.4 million pounds U_3O_8, down slightly (4 percent) from the 3.5 million pounds produced in the third quarter, and the average of 3.7 million pounds produced in the first three quarters of 1984. Most of this decline can be attributed to the following factors:

1. An 85-percent drop in production at Beisa (St. Helena) following the cessation of mining operations and the completion of underground reclamation;
2. A 40-percent decline in production at Blyvooruitzicht due to the slowing of operations following a decision to cease production by 1985;
3. A 31-percent decline at Driefontein Consolidated because of lower grades and a reduction of throughput in the closing months of 1984.

These losses were partially offset by a 37-percent production increase at JMS (Free State Joint Metallurgical Scheme), and a 10-percent increase at Buffelsfontein.

* * *

Total production in 1984 of 14,531,000 pounds U_3O_8 was five percent less than 1983 (Table 3). Eight producers experienced declines in production totalling approximately 1.2 million pounds, over 60 percent of which was attributed to Harmony, Beisa, and JMS (notwithstanding its fourth-quarter production increase). This decline was partially offset by increases in production by three producers amounting to approximately 450 thousand pounds. Randfontein and Vaal Reefs contributed 90 percent of the increase.

South Africa's gold and uranium industries experienced a relatively prosperous year despite lower US dollar prices for gold (Table 4). South Africa's contracts customarily are denominated in US dollars. Although most South African uranium sales involve long-term contracts in which spot prices do not play a crucial role, examining the relationship between the Exchange Value expressed in dollars and that expressed in rands can give an indication of the currency exchange rate's effect on long-term uranium prices. The Exchange Value declined 31 percent in dollar terms during 1984, but the 61-percent increase in the currency exchange rate caused the Exchange Value to rise 12 percent in rand terms. Moreover, because the prices South African producers received under long-term contracts did not decline in dollar terms nearly as much as did the Exchange Value, South Africa's long-term prices increased in rand terms even more than the 12 percent by which the Exchange Value increased. The severe depreciation of the rand in relation to the dollar also resulted in record rand gold prices. Since by-product and co-product uranium production from gold mining in general costs less than primary uranium production, the gold/uranium operations strongly contributed to the viability of the uranium industry in South Africa.

Palabora Mining Company (PMC) announced in its annual report to shareholders that it sold 502 thousand pounds of uranium concentrates in 1984. This represents a 2[illegible]-percent increase from the 356 thousand pounds sold in 1983. PMC, which is not a member of the Chamber of Mines, produces uranium as a by-product of its copper-mining operations.

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Table 3

REPUBLIC OF SOUTH AFRICA: 1984 URANIUM PRODUCTION[1]
(Thousands of pounds U_3O_8)

Operation	First Quarter 1984	Second Quarter 1984	Third Quarter 1984	Fourth Quarter 1984	Total 1984 Production
Beisa (St. Helena)[2]	338	333	107	16	794
Blyvooruitzicht	155	132	142	85	514
Buffelsfontein	313	331	337	371	1,352
Chemwes (Stilfontein)	310	279	290	276	1,155
Driefontein Consolidated	98	104	88	61	351
ERGO[3]	113	94	71	84	362
Harmony	307	259	274	255	1,095
Hartebeestfontein	248	253	225	237	963
JMS[4]	356	265	293	402	1,316
Randfontein	287	361	361	297	1,306
Vaal Reefs	1,069	1,129	1,078	1,052	4,328
Western Areas	175	171	164	163	673
Western Deep Levels	79	82	83	78	322
TOTAL	3,848	3,793	3,513	3,377	14,531

[1] Excludes Palabora Mining Company, which is not a member of the Chamber of Mines.

[2] Mining operations ceased and underground reclamation completed.

[3] ERGO = East Rand Gold and Uranium Co. Ltd.

[4] JMS = Free State Joint Metallurgical Scheme.

Table 4

URANIUM AND GOLD PRICES

Date	Nuexco Exchange Value (per lb. U_3O_8)	Percent Change	Gold Price (per ounce)	Percent Change	Exchange Rate (rand/dollar)	Percent Change
December 30, 1983					1.2182	
US Dollars	22.00		381.50			
SA Rand	26.80		464.74			
December 31, 1984					1.9666	+61
US Dollars	15.25	-31	309.00	-19		
SA Rand	29.99	+12	607.68	+31		

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RECENT DEVELOPMENTS

UNITED STATES

DOE announced that it has negotiated a concession from Tennessee Valley Authority (TVA) over the price of electricity purchased for use at two of DOE's uranium enrichment plants, in Paducah, Kentucky and Oak Ridge, Tennessee. Under the agreement, TVA would offer to supply low-cost electricity, called Experimental Test Energy (ETE), during TVA's non-peak hours, and would determine in advance the amount of ETE to be available. This follows Duke Power Company's 1984 offer to sell electricity to DOE at 18 mills/megawatt-hour (MWh), which failed when TVA refused to wheel the power to the enrichment plants.

DOE, in presentations to news media, publicized a 20-percent discount. However, it is clear that the actual savings will finally amount to less than one dollar per SWU. Various reports estimate the discount to be from 37 cents off the base cost per SWU to a 68-cent-per-SWU discount. The following pro forma analysis demonstrates the reasoning by which the estimated savings may be calculated.

Table 5 indicates DOE's approximate power costs before the announcement of the potential TVA agreement.

Given that DOE pays 25 mills per kilowatt-hour for firm energy (without the new discount), Table 5 can be used to estimate that DOE could buy a maximum of about 4,500 megawatts of electricity (MWe) from TVA in a given year. If DOE took less, it still would pay about 11 mills per MWe not taken.

The TVA discount for ETE could apply on weekends, holidays, and from 10 p.m. to 6 a.m. on weekdays. In the following calculations, it is assumed that the discount would be applied 40 percent of the time. The average TVA price for firm energy then becomes 23 mills per kilowatt-hour. If DOE continues to take 500 MWe per year from TVA, the average TVA price with the new discount will be:

$$\frac{11\,(4{,}500 - 500) + 23\,(500)}{500}$$

$$= 111 \text{ mills per KWh}$$

The overall price averaged over all suppliers will be:

$$\frac{(500 \times 111) + (1{,}380 \times 18.5) + (735 \times 23.6)}{2{,}615}$$

$$= 37.6 \text{ mills per KWh}$$

This represents an actual power cost reduction of one percent over the current cost of 38.0 mills per KWh, provided DOE does not redistribute their energy demand.

Assuming that 50 percent of the DOE SWU price to utilities is ascribed to energy costs, the TVA discount could yield a SWU price reduction of 0.5 percent, or 68 cents, if such a discount were fully passed on to the customers. Other assumptions would yield different numbers, but the reasoning would remain the same.

Table 5

DOE POWER COSTS

	Before July 1984		July 1984 to Oct. 1984		After Oct. 1984	
Source	Amount Purchased (MW/yr)	Unit Cost (mil/KWh)	Amount Purchased (MW/yr)	Unit Cost (mil/KWh)	Amount Purchased (MW/yr)	Unit Cost (mil/KWh)
TVA	1,140	57.3[1]	650	91.1[1]	500	113.2[1]
OVEC[2]	1,260	17.9	1,260	17.9	1,380	18.5
EEI[3]	735	22.1	735	22.1	735	23.6
Total (Average)	3,135	(33.2)	2,645	(37.1)	2,615	(38.0)[4]

[1] includes charge for power not taken.
[2] OVEC = Ohio Valley Electric Corp.
[3] EEI = Electric Energy Inc.
[4] Represents a 14.5-percent increase over the pre-July price.

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1984 US URANIUM ACTIVITIES

Introduction

Uranium exploration and mining activities decreased steadily throughout 1984 as the market for uranium concentrates continued the downward trend that began during the last quarter of 1983. Reduced competition for limited sales opportunities created a brief respite in the price decline, holding the Nuexco Exchange Value at $17.50 per pound U_3O_8 during the period June through September. However, as sellers adjusted to renewed market pressure, even lower prices prevailed. By year end, the Nuexco Exchange Value had reached $15.25, its lowest level since January 1975.

US uranium production for 1984 is estimated by Nuexco at about 15.4 million pounds, down from 21.2 million pounds in 1983. Solution mining in the South Texas district and phosphoric acid production in Florida and Louisiana accounted for almost 35 percent of the 1984 output. Conventional production centers continued to curtail activities during the year. Three milling operations closed down for six or more months, and several other projects were put on temporary stand-by, announcing intent to resume operations as the market recovers.

Exploration and development drilling activity declined as expected based on an active rig count. Nuexco estimates total drilling at 2.0 to 2.5 million feet as compared to DOE's estimate of 3.5 million feet for 1983. (*Note:* DOE no longer collects drilling and ore reserve information related to the uranium resource industry.) Nuexco's estimate is based on information supplied by a survey of selected companies.

Exploration drilling by at least six companies in the South Texas district averaged seven working rigs per month throughout the year; development drilling averaged six rigs per month.[1] Throughout Arizona, Colorado, Nebraska, New Mexico, Utah and Wyoming, at least 13 companies participated in drilling, with an average monthly rig count of 14 for exploration drilling and seven for development drilling. In the Grants, New Mexico district, for many years the most active district in the USA, there was no exploration drilling for eight months of the year, but one to four companies drilled during August to fulfill annual property requirements; development drilling was limited to nine months with one to three rigs.

Active Projects

Exploration activity in the South Texas district continued along known geologically favorable trends located primarily in Duval, Brooks and Kleberg counties. The favored targets were fine to coarse sand and conglomerate units of the Goliad Formation. Further north in Live Oak and Bee counties, the main target remains the Oakville Sandstone. There were no significant discoveries announced in 1984; however, development drilling in certain areas proved successful in delineating additional reserves and enhancing certain active solution-mining operations.

The area north and south of Grand Canyon National Park experienced a slight surge in activity. Five or six major uranium companies continued to acquire new ground for exploration, including geophysical and drilling programs. The exploration target is potentially high-grade deposits in breccia pipe structures common to the district. In addition, another eight to ten small exploration companies and independent operators competed for the more favorable exploration targets. Constructive exploration was limited primarily to annual work requirements related to conditions of property acquisition.

Energy Fuels Ltd. (EFL) remains the most aggressive and successful operator in the district. EFL presently is mining three highly mineralized breccia pipe deposits and is developing a fourth scheduled for production sometime in late 1987 or early 1988. In addition, EFL has applied to federal and state agencies with the intent of developing yet another deposit. The proposed project site is the Canyon pipe located on the south side of the Grand Canyon. If the project proceeds, it will be the first uranium mining in the southern rim district since the Orphan pipe was last mined in 1969.

Ferret Exploration Company continued to explore its Big Red property in Dawes and Box Butte counties of Nebraska. The mineral trend at the large Crow Butte deposit has been traced for several miles south onto the Big Red property. Ferret remains optimistic about property potential as a result of the important uranium resources identified to date.

Development of the Crow Butte project (owned 50 percent by Wyoming Fuel Company and 50 percent by Ferret) has been delayed by the permitting process. The joint venture anticipates licensing and permitting requirements will be in place in early 1985 and construction of a solution-mine pilot plant should begin by mid-to-late 1985.

Everest Minerals Corp. is continuing project feasibility studies on its Highland property located in South Powder River Basin, Wyoming. Everest has announced its intent to develop a solution mine on the property, probably during the second half of 1986. The ore deposit is a down-dip westward extension of Exxon's open pit, which closed in March 1984.

Events that further affected the US uranium industry in 1984 are listed chronologically in Table 6.

[1] It should be noted that by Nuexco estimate, drilling time per rig varies from 1 to 23 days per month and may average less than 10 working days per rig; thus, footage drilled was held below normal capabilities.

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RAW MATERIALS

Table 6

1984 URANIUM-RELATED ACTIVITIES IN THE USA

Month	Organization	Event or Announcement
Jan	Union Carbide Corp.	Reached agreement with Energy Fuels for operatorship and 70% of production capacity at the Energy Fuels Mill at White Mesa, Utah.
Jan	Western Nuclear, Inc.	Announced plan to reopen the mine at Ruby Wells, New Mexico.
Feb	Atlas Corp.	Closed the Velvet, Pandora and Rim mines. Announced plans to close the Moab mill; 200 employees affected.
Feb	US DOE	Estimated 1983 production at 21.2 million pounds compared to 26.9 million in 1982.
Feb	United Nuclear Co.	Ended negotiations to purchase Ogle uranium properties in Wyoming.
Mar	Reserve Oil & Minerals Corp.	Agreed to sell its Canadian uranium interests.
Mar	Pathfinder Mines Corp.	Closed its underground mining operations off the pit walls of the Lucky Mc mine, Gas Hills, Wyoming.
Mar	American Nuclear Corp.	Agreed in principle with TVA to end joint venture on properties in Wyoming.
Mar	Exxon Nuclear Co.	Closed its Highland open-pit mine, Powder River Basin, Wyoming.
Mar	Ranchers Corp.	Announced plans to merge with Hecla Mining Co.
April	Caithness Corp.	Began restoration at the McBryde solution mine, Hebbronville, Texas.
April	Tenneco Minerals Co.	Suspended production at West Cole solution mine, Hebbronville, Texas.
April	Union Carbide Corp.	All mineral resources to operate under new subsidiary—UMETCO Minerals Corp.
April	Plateau Resources Ltd.	Closed its mine at Shootaring Canyon, Utah.
June	Quivira Mining Co.	Laid off 276 employees in 40% cutback of mine and mill operations.
June	Exxon Nuclear Co.	Closed its Highland mill, Powder River Basin, Wyoming.
July	Western Nuclear, Inc.	Will reopen the Ruby Wells mine, recalling 70 employees.
July	Union Carbide Corp.	Announced intent to put all mining projects on standby during fourth quarter.
Aug	Western Nuclear, Inc.	Closed its Sherwood, Washington mine and mill.
Aug	Tennessee Valley Authority	Announced offer to sell open pit properties, Gas Hills, Wyoming.
Sept	Homestake Mining Co.	Placed its Grants, New Mexico mill on standby; 60 employees affected.
Oct	Union Carbide Corp.	Closed mills at Uravan, Colorado and Gas Hills, Wyoming. 30 employees laid off.
Nov	Federal Trade Commission	FTC approved merger plan for Chevron Corp. and Gulf Corp. Chevron will control the Mt. Taylor deposit, Grants, New Mexico.

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Table 6

1984 URANIUM-RELATED ACTIVITIES IN THE USA *(continued)*

Month	Organization	Event or Announcement
Nov	Homestake Mining Co.	Broke off negotiations with Midas, Inc., for participation in mine development at Grants, New Mexico.
Dec	American Nuclear Corp.	Reached final agreement with TVA to settle joint venture relationship in relation to properties in the Gas Hills and Powder River Basin, Wyoming.
Dec	Energy Fuels Nuclear, Inc.	Applied for permits to develop breccia pipe deposit on south side of the Grand Canyon, Arizona.
Dec	Union Carbide Corp.	Suspended uranium exploration affecting 50 employees; announced intent to stop all mining projects by March, 1985.
Dec	Pathfinder Mines Corp.	Will spend $4 million to modernize the Lucky Mc mill, Gas Hills, Wyoming.
Dec	Homestake Mining Co.	Recalled 20 employees in preparation of mill startup in early January.

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HISTORICAL MARKET DATA

EXCHANGE AND TRANSACTION VALUES SINCE JANUARY 1980

Determined as of the last day of the month indicated

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